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EXAMINER	
BELL, MELTIN	

ART UNIT	PAPER NUMBER
2121	14

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/767,279	Applicant(s) RISING, HAWLEY K.	
	Examiner Meltin Bell	Art Unit 2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) *1,2,6 and 7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-5 and 8-14* is/are rejected.

7)☒ Claim(s) *2,4 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *13/3-25-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This action is responsive to application **09/767,279** filed 01/22/01 as well as Amendment B filed 3/25/04 and the IDS filed 3/25/04. Currently amended and previously presented claims 3-5 and 8-14 filed by the applicant have been entered and examined. Claims 1-2 and 6-7 have been canceled as requested by the applicant. An action on the merits of claims 3-5 and 8-14 appears below.

Priority

Applicant's claim for domestic priority based upon application number 60/178,060 filed **01/24/2000** under 35 U.S.C. 119(e) is acknowledged.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Independent claims 3-5 and 8 stand rejected under 35 U.S.C. 103(a) as being obvious over *Samarasekera et al* U.S. Patent Number 5,960,055 (September 28, 1999)

in view of *Wu* "DART1—A Possible Ideal Building Block of Memory Systems" (27 June-2 July 1994).

Regarding claim 3:

Samarasekera et al teaches,

- creating a model for a desired function as a multi-dimensional function (column 5, lines 54-56, "One can also ... 3-D Radon space")

- determining if the created model fits a simple finite geometry model (column 5, lines 56-60, "The present inventors ... the Radon space")

- generating a Radon transform to fit the simple finite geometry model, the Radon transform generated by the second neural network (column 6, lines 17-23, "It is noted ... detector weight list 21"; column 5, lines 31-35, "the two-step 3-D Radon ... local Radon origins")

- feeding the desired function through the Radon transform to generate weights (FIG. 1; column 3, lines 50-62, "weight factors which...the Radon transform")

However, *Samarasekera et al* doesn't explicitly teach or training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other while *Wu* teaches,

- training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other (Abstract, "In this paper ... the future researches"; Fig. 1)

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Fast weight construction and generalization with little overhead (*Wu*, page 1090, section III, points 3-4, "The weight matrices ... Hamming distance space")
- Increasing precision (*Samarasekera et al*, column 3, lines 63-67, "The invention not...Furthermore, simple multiprocessor"; column 4, lines 1-2, "hardware, such as...of the invention")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Samarasekera et al* as taught by *Wu* for the purpose of improving classification accuracy, speed and generalization.

Regarding claims 4, 5 and 8:

The rejections of claims 4, 5 and 8 are the same as that for claim 3 as recited above since the stated limitations of the claims are set forth in the references.

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being obvious over *Samarasekera et al* in view of *Wu* and further in view of *Tam* U.S. Patent Number 5,446,776 (August 29, 1995).

Regarding claim 9:

Samarasekera et al teaches,

- creating a model for a desired function as a multi-dimensional function (column 5, lines 54-56, "One can also ... 3-D Radon space")

- determining if the created model fits a simple finite geometry model (column 5, lines 56-60, "The present inventors ... the Radon space")

- generating a Radon transform to fit the simple finite geometry model, the Radon transform generated by the second neural network (column 6, lines 17-23, "It is noted ... detector weight list 21"; column 5, lines 31-35, "the two-step 3-D Radon ... local Radon origins")

- feeding the desired function through the Radon transform to generate weights (FIG. 1; column 3, lines 50-62, "weight factors which...the Radon transform")

However, *Samarasekera et al* doesn't explicitly teach training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other or applying the Radon transform to the model in multiple stages if the created model has a geometry greater than two while *Wu* teaches,

- training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other (Abstract, "In this paper ... the future researches"; Fig. 1)

Tam teaches,

- applying the Radon transform to the model in multiple stages if the created model has a geometry greater than two (column 3, lines 35-42, "The calculating and ... different relative positions")

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Improved accuracy and efficiency (*Tam*, column 2, lines 59-68, "the calculation of ... also introduces inaccuracy"; column 3, lines 4-15, "it is a ... three dimensional interpolation")
- Fast weight construction and generalization with little overhead (*Wu*, page 1090, section III, points 3-4, "The weight matrices ... Hamming distance space")
- Increasing precision (*Samarasekera et al*, column 3, lines 63-67, "The invention not...Furthermore, simple multiprocessor"; column 4, lines 1-2, "hardware, such as...of the invention")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Samarasekera et al* as taught by *Wu* and *Tam* for the purpose of improving classification accuracy, speed and generalization.

Regarding claim 12:

The rejection for claim 12 is the same as that for claim 9 as presented above.

Claims 10 and 13 are rejected under 35 U.S.C. 103(a) as being obvious over *Samarasekera et al* in view of *Wu* and further in view of *Elsherif et al* "On Modifying the Weights in a Modular Recurrent Connectionist System" (27 June - 2 July 1994).

Regarding claim 10:

Samarasekera et al teaches,

- creating a model for a desired function as a multi-dimensional function (column 5, lines 54-56, "One can also ... 3-D Radon space")

- determining if the created model fits a simple finite geometry model (column 5, lines 56-60, "The present inventors ... the Radon space")

- generating a Radon transform to fit the simple finite geometry model, the Radon transform generated by the second neural network (column 6, lines 17-23, "It is noted ... detector weight list 21"; column 5, lines 31-35, "the two-step 3-D Radon ... local Radon origins")

- feeding the desired function through the Radon transform to generate weights (FIG. 1; column 3, lines 50-62, "weight factors which...the Radon transform")

However, *Samarasekera et al* doesn't explicitly teach training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other or a hidden layer of nodes and connections, and the weights are set on the connections at the hidden layer while *Wu* teaches,

- training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other (Abstract, "In this paper ... the future researches"; Fig. 1)

Elsherif et al teaches,

- a hidden layer of nodes and connections, and the weights are set on the connections at the hidden layer (page 536, paragraph 4, "In our research ... by the Back-propagation rule"; Figs. 1, 2; page 537, paragraph 1, sentence 2, "The input and the output control networks finds the best matching nodes for both of the input patterns and the desired outputs")

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Better generalization (*Elsherif et al*, page 536, paragraph 3, sentence 2, "Making the weights...improving the generalization")
- Fast weight construction and generalization with little overhead (*Wu*, page 1090, section III, points 3-4, "The weight matrices ... Hamming distance space")
- Increasing precision (*Samarasekera et al*, column 3, lines 63-67, "The invention not...Furthermore, simple multiprocessor"; column 4, lines 1-2, "hardware, such as...of the invention")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Samarasekera et al* as taught by *Wu* and *Elsherif et al* for the purpose of improving classification accuracy, speed and generalization.

Regarding claim 13:

The rejection for claim 13 is the same as for claim 10 since the limitations are similar.

Claims 11 and 14 are rejected under 35 U.S.C. 103(a) as being obvious over *Samarasekera et al* in view of *Wu* in view of *Elsherif et al* "On Modifying the Weights in a Modular Recurrent Connectionist System" (27 June - 2 July 1994) and further in view of *Tam* U.S. Patent Number 5,446,776 (August 29, 1995).

Regarding claim 11:

Samarasekera et al teaches,

- creating a model for a desired function as a multi-dimensional function (column 5, lines 54-56, "One can also ... 3-D Radon space")

- determining if the created model fits a simple finite geometry model (column 5, lines 56-60, "The present inventors ... the Radon space")

- generating a Radon transform to fit the simple finite geometry model, the Radon transform generated by the second neural network (column 6, lines 17-23, "It is noted ... detector weight list 21"; column 5, lines 31-35, "the two-step 3-D Radon ... local Radon origins")

- feeding the desired function through the Radon transform to generate weights (FIG. 1; column 3, lines 50-62, "weight factors which...the Radon transform")

- interpolating additional nodes in the hidden layer based on the additional weights (column 6, lines 33-38, "the weight factors...derivative calculation, etc.")

However, *Samarasekera et al* doesn't explicitly teach training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other, a hidden layer of nodes and connections, and the weights are set on the connections at the hidden layer or calculating additional weights using the Radon transform while *Wu* teaches,

- training a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other (Abstract, "In this paper ... the future researches"; Fig. 1)

Elsherif et al teaches,

- a hidden layer of nodes and connections, and the weights are set on the connections at the hidden layer (page 536, paragraph 4, "In our research ... by the Back-propagation rule"; Figs. 1, 2; page 537, paragraph 1, sentence 2, "The input and the output control networks finds the best matching nodes for both of the input patterns and the desired outputs")

Tam teaches,

- calculating additional weights using the Radon transform (column 3, lines 42-52, "Upon completion of ... the weight bin")

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Improved accuracy and efficiency (*Tam*, column 2, lines 59-68, "the calculation of ... also introduces inaccuracy"; column 3, lines 4-15, "it is a ... three dimensional interpolation")
- Better generalization (*Elsherif et al*, page 536, paragraph 3, sentence 2, "Making the weights...improving the generalization")
- Fast weight construction and generalization with little overhead (*Wu*, page 1090, section III, points 3-4, "The weight matrices ... Hamming distance space")
- Increasing precision (*Samarasekera et al*, column 3, lines 63-67, "The invention not...Furthermore, simple multiprocessor"; column 4, lines 1-2, "hardware, such as...of the invention")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Samarasekera et al* with *Wu, Elsherif et al* and *Tam* for the purpose of improving classification accuracy, speed and generalization.

Regarding claim 14:

The rejection for claim 14 is the same as the rejection for claim 11 as set forth above.

RESPONSE TO APPLICANTS' AMENDMENT B CLAIMS REMARKS

Information Disclosure Statement

Applicant(s) argue(s) the Examiner has indicated that the Information Disclosure Statement (IDS) filed November 21, 2003, failed to comply with the provisions of 37 C.F.R. §1.97 and MPEP §609 because of missing or inaccurate information in the listing. Applicant respectfully submits herewith an IDS to address the inaccuracies, and requests that the Examiner consider the information listed therein as to its merits. The IDS submitted herewith also includes references in addition to those previously submitted on NOVEMBER 21, 2003, and Applicant respectfully requests the Examiner to consider them as to their merits and mark them as being so considered. Applicant further requests that the Examiner mark as considered all other references in the IDS submitted on November 21, 2003 (Amendment B REMARKS page5, paragraph 3).

The IDS filed 3/25/04 providing a listing for the Warrick et al reference included with the 11/21/03 IDS, corrected titles for each of the three Sahiner et al references noted in the 11/21/03 IDS and a corrected title for the Olson et al reference noted in the

11/21/03 IDS have been considered. Other documents considered in the 3/25/04 IDS include

- the Walnut et al reference with USPN 5,953,388
- USPN 5,400,255 published 3/21/95

Photocopies of the 11/21/03 IDS listings reflect signed and initialed documents considered on 12/11/03.

The Khuwaja et al reference in the 3/25/04 IDS was not considered since the date of publication is missing. It has been placed in the application file. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Drawings

Applicant(s) argue(s) that the drawings stand objected to by the Draftsperson. Accordingly, replacement drawings have been submitted. The drawings have been reviewed by the Draftsperson and are approved (Amendment B REMARKS page 5, paragraph 4).

The objections to the drawings are withdrawn.

Specification

Applicant(s) argue(s) that the present title, "A Method And Apparatus Of Using A Neural Network To Train A Neural Network, " closely follows the preamble of each independent claim, and thus is clearly descriptive of the invention as claimed. Furthermore, the title complies with the requirement of 37 C.F.R. § 1.82 that the title "must be as short and specific as possible." Accordingly, Applicant requests that the objection to the title be withdrawn (Amendment B REMARKS page 6, paragraph 1).

The objection to the title is withdrawn.

Claim Rejections - 35 USC § 101

Applicant(s) argue(s) that although claim 2 has been canceled, its limitations are incorporated in amended independent claim 3, which originally depended from claim 2. Applicant has amended claim 3 to recite a method for execution by a processor. Applicant submits that a method for execution by a processor is within the technological arts. Applicant has amended independent claim 4 to be drawn to a computerized system. Applicant submits that a computerized system is within the technological arts. Applicant respectfully reminds the Examiner that "a specification which contains a disclosure of utility which corresponds in scope to the subject matter sought to be patented must be taken as sufficient to satisfy the utility requirement of § 101 for the entire claimed subject matter unless there is a reason for one skilled in the art to question the objective truth of the statement of utility or its scope." (MPEP 2107.02. Applicant respectfully submits that the usefulness of neural network in general is well

understood. Further the ability to train a neural network using a neural network, as opposed to human training, is also well understood (Amendment B REMARKS page 6, paragraphs 3-5).

The rejection of canceled claim 2 and currently amended claim 4 under 35 U.S.C. § 101 is withdrawn.

Claim Rejections - 35 USC § 112, First Paragraph

Applicant(s) argue(s) that the claimed invention has utility based on the amendments to claims 3 and 4 and the discussion above with respect to the rejection under 35 U.S.C. § 101. Applicant further submits that the Applicant's specification provides enablement of the claimed invention (Amendment B REMARKS page 7, paragraph 7).

The rejection of canceled claim 2 and currently amended claim 4 under 35 U.S.C. § 112, first paragraph is withdrawn.

Claim Rejections - 35 USC § 112, Second Paragraph

Applicant(s) argue(s) that claim 7 has been canceled and that is limitations are incorporated in amended independent claim 8, which originally depended from claim 7. Applicant respectfully submits that claim 8 has been amended to claim the Radon transform generator coupled to a feeder (Amendment B REMARKS page 7, paragraph 4 through page 8, paragraph 1).

The rejection of canceled claim 7 under 35 U.S.C. § 112, second paragraph is withdrawn.

Claim Rejections - 35 USC § 103

Applicant(s) argue(s) that claims 2, 4, 5 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over "On Modifying the Weights in a Modular Recurrent Connectionist System," by Elsherif et al ("Elsherif"), in view of Boone et al., U.S. Patent No. 5,953,452 ("Boone"), and Samarasekera et al., U.S. Patent No. 5,960,055 (Samarasekera"). Applicant respectfully submits that the present claims are patentable over the Examiner's recited combination. Applicant has canceled claims 2 and 7. Accordingly, the Examiner's rejection of these claims is moot (Amendment B REMARKS page 8, paragraphs 2-3).

The rejection of canceled claims 2 and 7 under 35 U.S.C. § 103 are withdrawn.

Applicant(s) argue(s) that Claims 3 and 8-14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Elsherif in view of Boone, Samarasekera, and "Inversion Processes in the Human Visual System," by Rising ("Rising"). Applicant respectfully submits that the present claims are patentable over the Examiner's recited combination (Amendment B REMARKS page 8, paragraph 4).

Applicant respectfully submits that the Rising reference, "Inversion Processes in the Human Visual System," is not a proper reference under any section of 35 U.S.C. §103 or 35 U.S.C. §102. The Rising reference was published in the Proceeding of the SPIE, Volume 3959 in June, 2000. The Table of Contents of the Proceedings is

submitted herewith. The TOC lists the Rising reference at page 400. The present application has a filing date of January 22, 2001, and claims the benefit of U.S. Provisional Patent Application 60/178,060, which was filed January 24, 2000. The Provisional Application is based on the text of the Rising Reference as it was subsequently published, and is Applicant's own work. Accordingly, since the Rising reference was published after Applicant's effective filing date of January 24, 2000, it cannot properly be used to reject the present claims (Amendment B REMARKS page 8, paragraph 5 and page 9, paragraph 1).

The rejections of independent claims 3-5 and 8 under 35 U.S.C. § 103 as being unpatentable over Elsherif in view of Boone, Samarasekera and Rising are withdrawn.

Applicant(s) argue(s) that the amended claims more particularly point out what Applicant regards as their invention. No new matter has been added as a result of these amendments (Amendment B REMARKS page 5, paragraph 2).

The examiner agrees that the 'a first neural network and a second neural network are dual to each other' limitation of independent claims 3-5 and 8 is not taught or suggested in Elsherif, Boone and Samarasekera and that the Rising reference was improperly applied in rejecting claims in the previous action. However, *Wu* "DART1—A Possible Ideal Building Block of Memory Systems" (27 June-2 July 1994) ("Wu") and *Tam* U.S. Patent Number 5,446,776 (August 29, 1995) ("Tam") are currently cited as proper references under 35 U.S.C. § 102 and 35 U.S.C. § 103 with Boone, Elsherif and

Samarasekera. While Wu discloses in its Abstract and Fig. 1 the training of a multilayer perceptron of the first neural network using the weights, wherein the first neural network and the second neural network are dual to each other, Tam discloses in column 3, lines 42-52 the calculating of additional weights using the Radon transform. Further, the motivation for combining the references includes Tam's improved accuracy and efficiency disclosed in column 2, lines 59-68 as well as column 3, lines 4-15 and Wu's fast weight construction disclosed on page 1090, section III, point 3. Since the combination of these references teach each element of the claims, the above obviousness rejections of all claims under 35 U.S.C. § 103 are proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- *Samarasekera et al;* U.S. Patent Number 5,960,055; Fast cone beam image reconstruction using a detector weight list

- *Tam;* U.S. Patent Number 5,446,776; Tomography with generation of radon data on polar grid points

- *Wu;* DART1-a possible ideal building block of memory systems; IEEE International Conference on Neural Networks; IEEE World Congress on Computational Intelligence; Vol. 2; 27 June-2 July 1994; pp 1086-1091

- *Elsherif et al*; On modifying the weights in a modular recurrent connectionist system; 1994 IEEE International Conference on Neural Networks; IEEE World Congress on Computational Intelligence; Vol. 1, 27 June-2 July 1994 pp 535-539

Any inquiry concerning this communication or earlier communications from the Office should be directed to Meltin Bell whose telephone number is 703-305-0362. This Examiner can normally be reached on Mon - Fri 7:30 am - 4:30 pm.

If attempts to reach this Examiner by telephone are unsuccessful, his supervisor, Anthony Knight, can be reached on 703-308-3179. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Anthony Knight
Supervisory Patent Examiner
Group 3600

MB /